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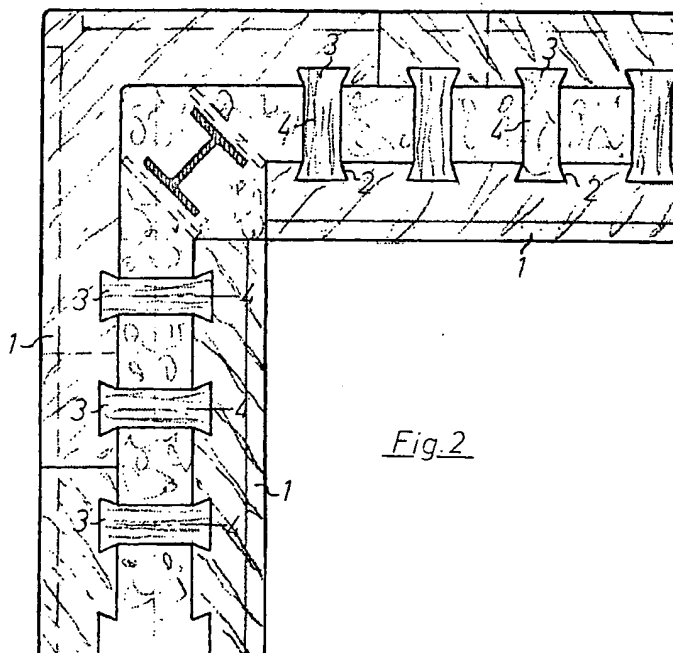
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(54) **Kit and process for constructing buildings**

(57) It is disclosed a building kit for erecting buildings, especially wall constructions in buildings, comprising at least two mainly parallel wall plate elements (1), where the wall plate elements (1) are equipped with a number of grooves (2) on at least one side of the elements (1), said grooves (2) having a shape so that the part of the grooves (2) lying inside the wall (1) is larger

than the mouth of the groove (2) opening towards one of the surfaces of the wall (1), where it between the grooves (2) in the wall elements (1) run joining elements (4) being designed with an extended part fitting inside the extended part of the wall groove (2). It is also disclosed joining elements (4) connecting adjoining and abovelying wall elements (1).



*Fig. 2*

## Description

The present invention concerns the provision of a kit for constructing buildings as well as a process for erecting such buildings with the help of such a kit.

When erecting buildings it has previously been used a per se known isolating material comprising a cement-stabilised composition of cement and a porous, polymer-based isolating material, e.g. expanded polystyrene (EPS), said composition being marketed under the trade-name "Thermozell", or a composition of a different expanded polymer material, e.g. polyurethane and cement.

When mixing cement and an expanded polymeric material, e.g. expanded polystyrene, it has been shown that there arises a material which avoids the low blow resistance of the polystyrene by the cement contributing a more blow-resistant structure to the finished product than what is the case with expanded polystyrene alone, and simultaneously an addition of expanded polystyrene particles gives the composition a significantly lighter relative weight than compact cement as well as adds to the finished material significantly improved isolating properties.

Additionally such a composition is difficult to ignite and it may be used as a fire-proof shielding. It has good isolating properties based on the combined isolating properties of both expanded polyethylene and cement.

It has, however, been found that such compositions have not been used for carrying structures within the construction industry on account of the light and poorly carrying properties of the composition alone.

It has now surprisingly been found that if a composition comprising cement and an expanded polymeric material is added to other non-carrying or poorly carrying structures, the composition will give the non-carrying or poorly carrying structure a significantly improved carrying property which is far greater than what might be expected from the sum of the carrying properties of the materials and constructional elements separately. Consequently it has been found that there arises some sort of synergistic effect concerning the carrying properties when the composition of the expanded polymeric material and cement is added to a non-carrying or poorly carrying building structure so that there is produced a carrying structure with properties which are sufficient for using them as carrying elements in the building.

By using building elements constructed thus, there may be formed building kits comprising a small number of basic elements which may be used for creating most forms of building structures. By using such elements there may inter alia be built formwork elements for cement-based EPS-isolation where the elements become part of the finished wall construction of the building. It is previously known that form-cast EPS-blocks may be used for this purpose for in this way to construct a pre-isolated wall with a core of concrete/cement, but such a previously known type of wall does not use the above

mentioned synergistic effect between the cement and the EPS/polymer. To be able to construct a complete wall there had to be made different blocks for long walls, corners, door and window openings etc. since the wall thickness was set and the cavities within the block were the same. Such a form of blocks are often unnecessarily expensive on account of the many models/blanks, and last but not least this was associated with large transport costs since the cavities in the block could not be used effectively.

When designing a combined carrying and isolating element according to the present invention, as explained supra, pre-formed elements may be brought down to only four element blanks which may be transported in a compact form to the building site.

The designing of a building kit for buildings comprising carrying cement-stabilised EPS elements as well as distance elements of an isolating polymeric material between these carrying elements, may be done as shown in the accompanying figures wherein:

Fig. 1 shows a possible design of a number of binding EPS elements which may be placed between two wall-plate elements,

Fig. 2 shows an assembly of two wall elements bound together with a number of connecting EPS elements as shown in fig. 1,

Fig. 3 - 5 show alternative designs for the connecting EPS elements securing the wall plates,

Fig. 6 shows a design of a connection between stacked wall elements.

The erection of a carrying wall with the elements according to the present invention will be carried out in such a way that two wall plates 1, comprising a number of grooves 2 which in their design correspond to the outer edges 3 of the connecting elements 4, are bound together by the elements 4 by the elements 4 being placed in the grooves 2. The outer edges 3 of the connecting elements 4 may be designed with a round, T-formed, conical etc. area which fit into the grooves 2 in the wall elements 1. The width and height of the elements is arbitrary but should not be made too big. The dimensions of these elements will be easy to determine for the person skilled in the art for any given type of wall. By placing a number of such elements 4 with their outer edges above each other in the grooves 2, and place wall elements 1 on each side of the connecting elements 4, there will be made a wall construction which comprises a number of cavities between the connecting elements 4.

In this situation it will be possible to go two ways for constructing carrying or non-carrying walls. If the wall plates 1 are designed with a rigid sheath surrounding the cement/EPS-containing core so that it is created

constructive bracing plate elements, then the wall construction may be used as it is. This is also true if there for the distance-creating elements 4 are used elements which are built in the same way as disclosed supra.

On the other hand, if the wall construction does not have the necessary rigidity to make a carrying and constructive wall, then the cavities being formed between the distance elements 4 may be filled with further stiffening material, e.g. cement or concrete or be filled with cement-stabilised EPS.

In an alternative embodiment some or all of the distance elements 4 may be made of a securing material, e.g. wood or plastic, for thereby creating the possibility of fastening an internal or external panelling (not shown) to the elements 3.

For an extra bracing in the corners of the wall assembly, an I-beam or any other corresponding bracing element may be placed between the wall elements. However, this may not be necessary for creating an adequate wall construction with the building kit according to the present invention.

The present connecting elements 4 in a wall assembly created with the building kit according to the present invention may, with joints between the wall elements 1 in the height direction, simultaneously form a bracing as well as joining construction by the elements 4 running transversely of the joint over adjoining wall elements 1. Such a joining function will be necessary in high wall assemblies where it is difficult to form the wall elements of one continuous piece. In such a joining construction the grooves 2 for the joining elements 3,4 in the wall element 1 need not be penetrating over the total length of the wall element 1, but may only run across a part of the distance down the inside of the wall element 1 so that it is formed a bottom for the joining elements 3,4 when the building kit is assembled. In such an embodiment it will be preferred that the grooves 2 run downwards in the wall element over a distance corresponding to half of the width of the joining elements 3,4 for thereby creating a groove where the joining elements also joins together two adjoining wall elements 1.

2. Building kit according to claim 1, **characterized in** that the outer edge area (3) of the grooves (2) has the form of a T, a partial cylinder or a cone.
3. Building kit according to claim 1 or 2, **characterized in** that the grooves (2) in the wall element (1) run inwards from each edge of the wall element (1) for a distance which corresponds a part of, preferably half of, the width of the joining elements (4).
4. Process for producing a building by using a building kit according to claim 1, 2 or 3, **characterized in** that the wall plates (1) are mounted with the joining elements (4) by placing the elements (4) in the grooves (2) in the wall elements (1) for creating a connecting lattice of elements (4), whereby a stabilised composition of cement and a porous, polymer isolating material, e.g. expanded polystyrene (EPS) is filled inside the space being present between the connecting elements (4) and the wall plates (1), and where the composition is allowed to set for creating a carrying and isolating wall for use when constructing a building.
5. Process according to claim 4, **characterized in** that the joining elements (4) are mounted in connecting grooves (2) between adjoining and overlying wall elements (1).

## Claims

1. Building kit for erecting buildings, especially wall constructions in buildings, comprising at least two mainly parallel wall plate elements (1), **characterized in** that the wall plate elements (1) are equipped with a number of grooves (2) on at least one side of the elements (1), said grooves (2) having a shape so that the part of the grooves (2) lying inside the wall (1) is larger than the mouth of the groove (2) opening towards one of the surfaces of the wall (1), where it between the grooves (2) in the wall elements (1) run joining elements (4) being designed with an extended part fitting inside the extended part of the wall groove (2).

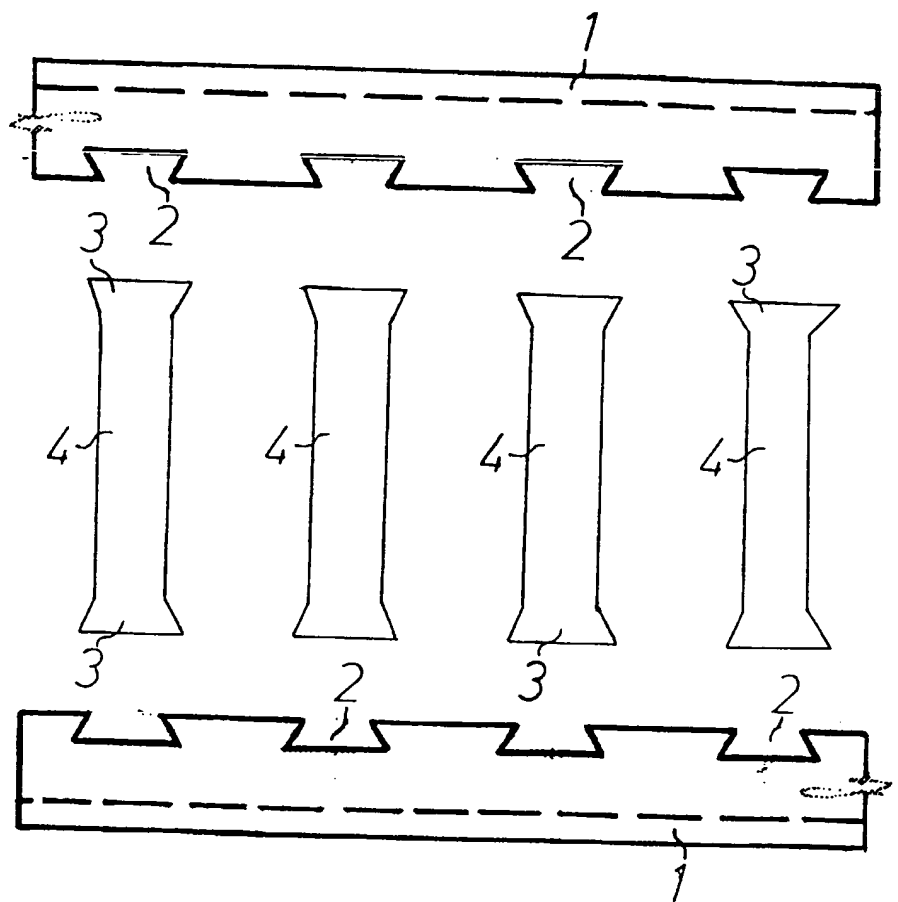


Fig. 1

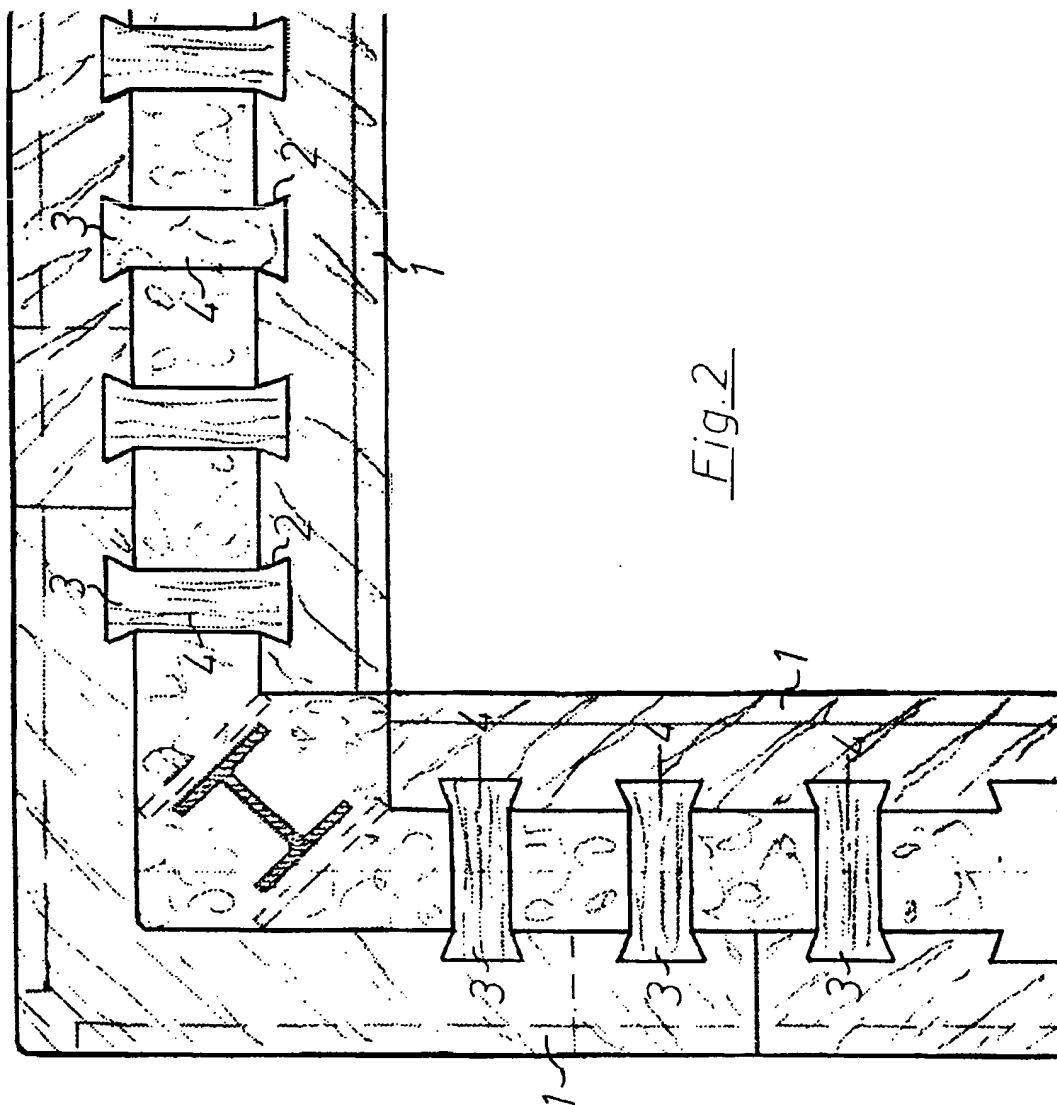


Fig. 2

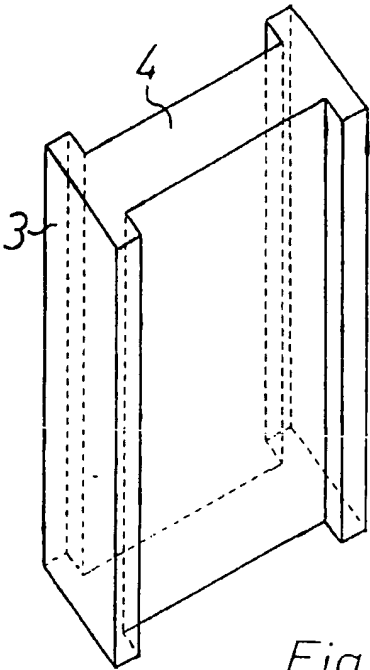


Fig. 3

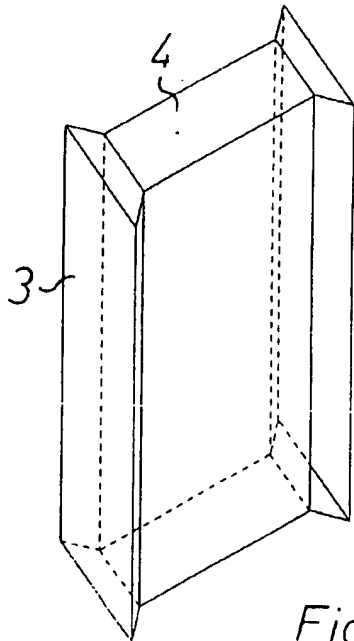


Fig. 4

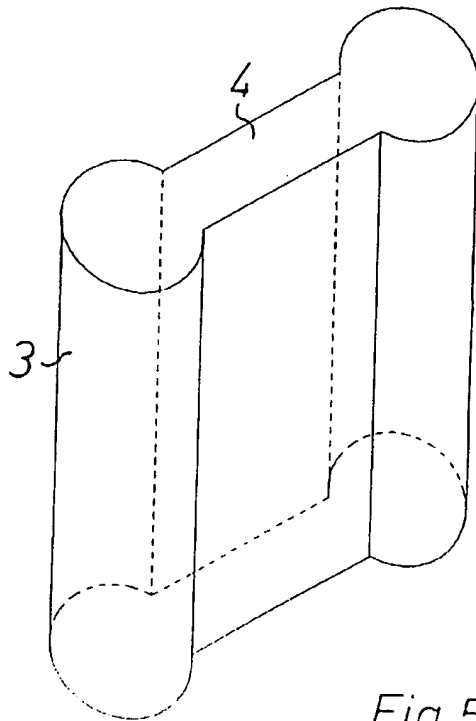


Fig. 5

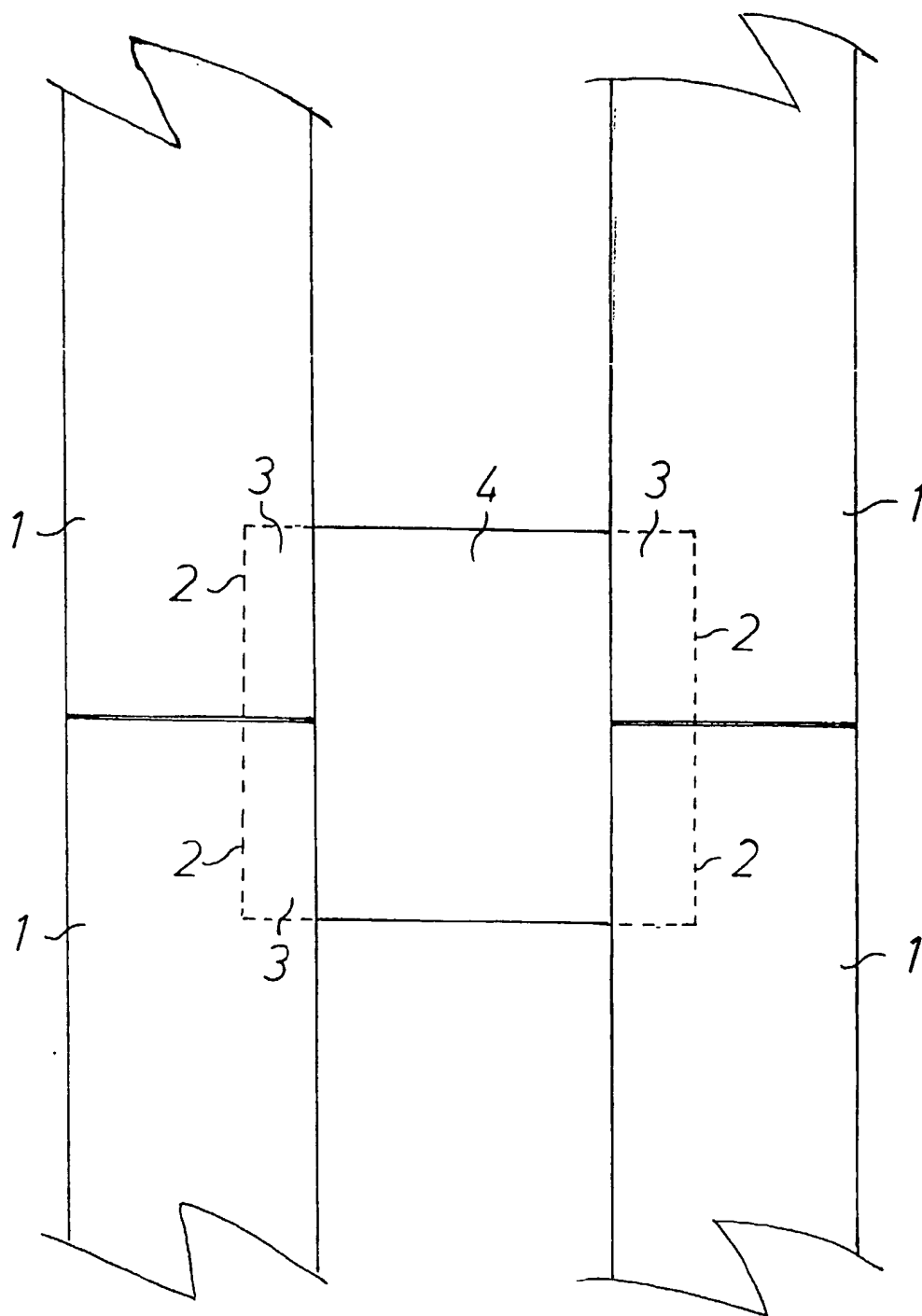


Fig.6